Electromagnetic

(1) Attractive as for a negative Force to exist the charges need to be opposite

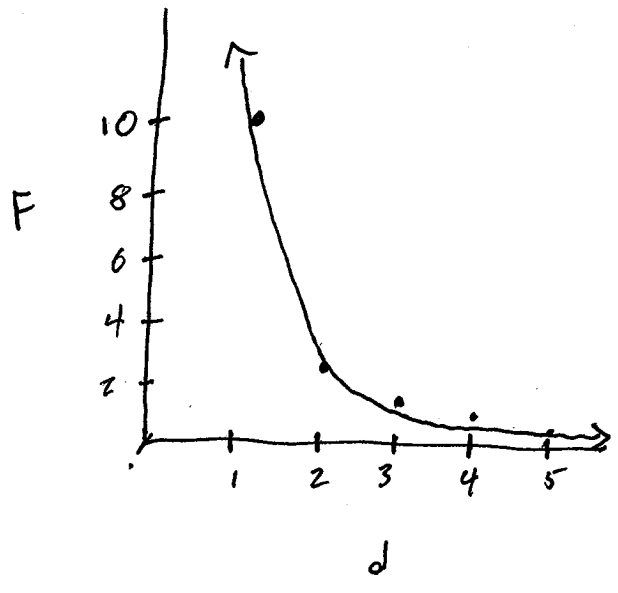
(2) $$F = 9.0\times10^{9}\ \frac{N m^2}{C^2} \times \frac{6.0\times10^{-6}\,C \times 6.0\times10^{-6}\,C}{(0.50\,m)^2}$$

$$= 1.3\ N$$

(3) $$F = 9\times10^{9}\ \frac{N m^2}{C^2} \times \frac{-2\times10^{-4}\,C \times 8\times10^{-4}\,C}{(0.3\,m)^2}$$

$$= -1.6\times10^{4}\ N$$

(4)



$F_1 = 10\ N$

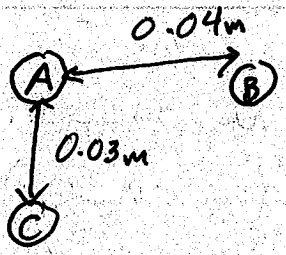
$F_2 = 2.5\ N$

$F_3 = 1.1\ N$

$F_4 = 0.63\ N$

$F_5 = 0.41\ N$

(5)

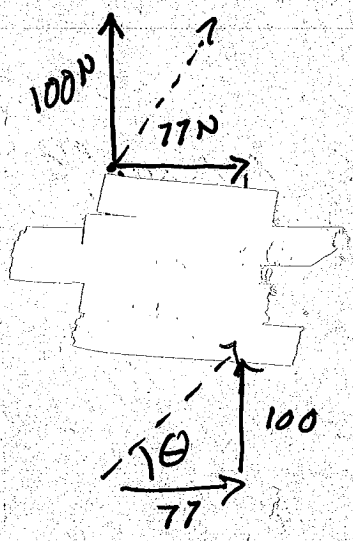


$$F_{AB} = \frac{9\times10^{9} \times 5\times10^{-6} \times 2.75\times10^{-6}}{(0.04)^2}$$

$$= -77\ N$$

$$F_{AC} = \frac{9\times10^{9} \times 5\times10^{-6} \times 2\times10^{-6}}{(0.03)^2}$$

$$= 100\ N$$



$$F_{Net} = \sqrt{77^2 + 100^2}$$

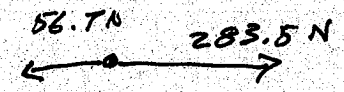
$$= 126\ N$$

$$\theta = \tan^{-1}\left(\frac{100}{77}\right) = 52^\circ$$

$F_{Net} = 126\ N\ [52^\circ\ UP]$

(6)

Ⓐ .5m Ⓑ .2m Ⓒ



$$F_{AB} = \frac{9\times10^{9} \times -4.5\times10^{-5} \times 3.5\times10^{-5}}{(.5)^2}$$

$$= -56.7\ N$$

$$F_{BC} = \frac{9\times10^{9} \times 5.5\times10^{-5} \times -3.6\times10^{-5}}{(0.2)^2}$$

$$= -283.5\ N$$

$F_{net} = 227\ N\ [Right]$

(7) $q = 1.6\times10^{-19}\ C$

$$F = \frac{9\times10^{9} \times 1.6\times10^{-19} \times -1.6\times10^{-19}}{(1.25\times10^{-11})^2}$$

$$= -1.47\times10^{-6}\ N$$